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HEALTH SERVICE IN INDUSTRY

Research Report Number 34
January, 1921

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Health Service in Industry

INTRODUCTION

It is the aim of this report to present a survey of what has been accomplished in the development of that important branch of industrial organization, the Medical Department, and to discuss methods of procedure which have been applied advantageously in individual establishments. The report is based on material gathered through field investigations and questionnaires by the National Industrial Conference Board in co-operation with the Conference Board of Physicians in Industry.

The Conference Board of Physicians in Industry[1] is an informal association of medical directors of industrial organizations employing together over half a million men and women, skilled and unskilled, of many nationalities, speaking many languages, and working both indoors and out of doors in a variety of occupations. This Board of Physicians was organized on April 4, 1914, for

> "cooperative effort in introducing into industrial establishments the most effective measures for the treatment of injuries or ailments of employees; for promoting sanitary conditions in workshops; and for the prevention of industrial diseases."

It now acts as advisor to the National Industrial Conference Board on medical problems in industry.

The members of the Conference Board of Physicians in Industry are men of wide experience in their respective fields of industrial medical work, who have gained a thorough understanding of the requirements of their industries from the humane point of view, and of the physical ability of men and women generally to meet these requirements. They are also familiar with the personal habits and the living and working conditions of industrial workers, and are therefore particularly competent to deal with medical problems in industry.

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[1] For list of members see Appendix, page 61.

At the bi-monthly meetings of this Board the results of individual experiences and investigations are considered, and from these and resultant discussions certain uniform rules of plant medical practice are developed. Standardized methods of first-aid treatment, standards of equipment for first-aid rooms and of contents of first-aid outfits, and uniform methods of physical examination and record keeping in industrial medical departments have been evolved by the Board of Physicians. These methods were tried out in actual plant practice for several months by Board members and others before being finally accepted, so that as here given they represent the best practice in this branch of medical work.

This report is intended to offer a broad view of present practices in industrial health work. It does not attempt to cover in detail such related matters as the cost of health service, scope of activities of individual medical departments in industry, and details of organization. In respect to these subjects comprehensive information is now being collected as a basis for a further report.

I

INDUSTRIAL HEALTH SERVICE TODAY

Health service in industry is no longer an experiment. It has proved so satisfactory that, where installed and conducted in an intelligent manner, it has become an integral part of the industrial organization. Introduced primarily to care for industrial accidents, the work has broadened until it now embraces fields usually thought far removed from that of medicine, but which are, after all, closely allied with it from an industrial point of view.

The value of medical service in industry became emphasized when workmen's compensation laws were enacted and the burden of the expense of injuries to workmen was placed largely on the employer. It became necessary for the employer to provide medical and surgical treatment for workers injured while in his employ and, in addition, to prevent injuries so far as lay within his power. Preventive medical work in industry proved itself of the greatest importance and demonstrated that early attention to trivial accidents and injuries reduced the amount of compensation to be paid by the employer and the amount of time lost by the employee. Moreover, experience showed that the best working conditions produced the least sickness among employees and the smallest loss of working time due to accidents, and that conditions inimical to the health of the workers could be removed with positive assurance that the general physical and mental health would be benefited thereby, resulting, in turn, in increased production and lessened labor turnover. In other words, it has been found that proper health supervision of workers pays in terms of the return upon the investment, besides fulfilling broad humanitarian considerations.

Competent physicians in industry thus became gradually cognizant of the fact that the greatest value of industrial medical work lay in keeping the worker well rather than in curing his disability; for a person of healthy mind and body views his surroundings and associations differently from one affected by illness or dissatisfaction, and a contented and healthy worker can produce more and better than a dissatisfied and sick employee. The true industrial physician today accepts this as one of his guiding principles.

THE FUNCTION OF THE PHYSICIAN IN INDUSTRY

Industrial medical work is rapidly developing a group of physicians who are capable of adapting themselves to new conceptions of the relation of the medical profession to the community. They are men of vision who look beyond the immediate daily medical tasks and see the value of fitting the worker to his work. In co-operation with other departments they probe the disability to find the cause, whether it be in the plant, the worker's home or in the worker himself.

At first the medical practitioner called into industry did not usually concern himself with the inner workings of the plant nor with plant hazards. He cared only for what came his way, taking his work much as he would if a similar group of patients visited his private office. Medical equipment in industry was either inadequate or entirely lacking. Scientific first-aid work was practically unknown; physical examinations of workers were not considered worth while. In fact, the employment of a physician was looked upon largely as an act of benevolence on the part of the employer.

In contrast, the work of the physician in industry, as it is understood today, touches all departments and all activities of the industrial organization. The physician who confines his activities to the four walls of the plant dispensary is found to be of but limited value to the industry with which he is associated. It is only as his influence reaches out into the operating departments that his full possibility of service is realized.

Hand in hand with his curative and preventive activities goes a desire to see that only men and women who are physically qualified for the work they seek are placed in that work. It has been found that one of the best methods of achieving this is through the physical examination of workers and of applicants for employment. Under such an arrangement the physician first comes in contact with a worker in the physical examination room. Not only is the applicant's physical condition determined, but his mental attitude as well is considered. His reaction toward industry in general and particularly toward the place where he seeks employment can be gauged with a fair degree of accuracy by tactful questioning at the time the physical examination is made. A word at such times may change the mental bias of such a person and direct it from destructive into constructive channels.

In order to place employees in their proper work, from the standpoint of physical fitness, experience has shown that the industrial physician today finds it necessary to know what is being done in the various plant departments and to know how, and with what facilities it is being done. To make an intelligent application of the findings of the physical examination he has to familiarize himself with the various plant processes and operations. This leads him into close association with the operating officials, the superintendents and the foremen, and enables him to see the problem of plant administration from their side as well as from the side of the worker.

This study of processes and job requirements brings to light the degree of hazard present in different operations, and suggests protective measures to meet each situation. Doubtless, certain hazards will remain concealed until cases of accident or illness bring them sharply to the attention of the managerial staff, but most of them, and especially those of major character, reveal themselves when the process studies are carried on.

The physical examination in industry has of late developed into a new field, with very important consequences to industrial efficiency. It has become recognized that the health of executives of industrial organizations needs constant supervision, so that the development of any impairment due to working or living conditions may be detected in ample time to permit of such correction as will not necessitate loss of services of these key men so important to the efficient and uninterrupted operation of industry. Business executives, more than the workers further down the industrial scale, are apt to neglect proper and timely attention to their health in their zeal to discharge the trust and functions of direction imposed upon them. It has also been shown that the mental strain under which these executives live adds the possibility of mental impairment and even breakdown to that of physical ill health. Therefore, arrangements have been made by the plant physician in some industrial organizations for the periodic examination of the executives by specialists or groups of specialists. Usually the findings are held confidential between the executives examined and the specialists examining them. The plant physician may merely arrange for the examination without knowing of the results, unless he should be the examining physician or one of the group of specialists, or unless he should be entrusted with the carrying out of such measures as were recommended as the result of the examination.

The industrial physician today should be a hygienist as well, who knows the best practices of factory lighting and ventilation, whether personal service facilities are adequate and properly placed and cared for, and whether the processes upon which the workers are engaged are productive of unnecessary fatigue or other harmful effects. In this connection he should be capable of making and directing research studies in factory sanitation, lighting, ventilation, dusty trades and processes, fatigue, and similar factors, and of interpreting the findings in a satisfactory manner.

That some of the physicians in industry are not skilled in such investigations is due to two factors: first, because employers have until recently assumed that such studies should be made by engineers rather than medical men; and second, because until recently no adequate provision had been made for training physicians in these lines of research activity. This lack of educational facilities is now being met in some medical schools by special courses in industrial hygiene and related problems.

Experience has shown that the physician in industry should have thorough general training in both medicine and surgery. He will be called upon, however, to give medical and minor surgical treatments much more frequently than to render major surgical service. There are few industrial accidents of such character as to require the services of a major surgeon, and when the need for it arises, competent surgical assistance can always be secured promptly or be found at hospitals to which these cases are usually taken. After all, the technique of surgical treatment of major industrial accident cases is not different from that of others of a similar nature. On the other hand, the highly specialized training of the surgeon has the tendency to crowd out the industrial point of view in its broader aspects, which is so necessary to the proper treatment of the smaller and surgically less important, but far more numerous accidents that make up the bulk of industrial cases.

In has been found that when injuries occur in the course of employment, the industrial physician is called upon to view them from the three angles of a triangle of influence which bears on each case. His primary concern is to see that prompt and proper treatment is given by way of surgical dressing and re-dressing of the case, so that the patient may be restored to his full working efficiency in the shortest time. He then helps to determine the cause of the accident. The immediate cause may be quite evident—a misplaced guard, an obstruction in the aisle, or improperly piled material which fell when disturbed; the remote but controlling cause may be less easy to determine. It may be found that the fault is chargeable to lax methods of discipline on the part of the foreman in permitting unsafe practices to continue; or to an overbearing manner by a managerial assistant, in turn causing the worker to be rebellious in spirit; or to the carelessness or disobedience of instructions on the part of the worker; or he may conclude that no reason for the accident exists in the working conditions of the injured but may be found in the worker's physical condition or in his home environment. Domestic infelicity, illness in the family, financial stringency, juvenile delinquencies or other distracting worries may have so upset an otherwise careful worker that for the moment he became careless and as a consequence was injured.

The plant physician, more than any other member of the industrial organization, is in a position to project himself without evoking resentment into the home and community life of workers and to assist in the proper adjustment of disturbing factors in these fields.

Finally, the truly successful physician in industry must ever be actuated by the spirit of fair dealing with both management and men. While duly mindful of the industrial necessity for increased production and improved efficiency, he should not permit his zeal in the interests of the management to outweigh his better judgment as to the proper limitations of service applicable to each worker. Neither should his sympathy for the employee lead him to excuse self-imposed limitations of service and production that have no justification in fact. Like few others in the plant, the modern industrial physician's interest in all such matters is limited to seeing that the spirit of fair play prevails, so that in the course of time all parties may come to look upon him as an impartial and competent judge of work conditions and work performance in relation to physical and mental capacity. With this confidence in the physician established, employees tend to bring to him many questions about their work, their families, or themselves, in the answering of which he may blend sympathetic interest with practical advice, to the advantage of both management and men. The industrial physician thus becomes today one of the best balance wheels in the field of industrial relations.

At first the incorporation of medical departments into industrial organizations was more or less an experiment. In common with all new and progressive movements it had to meet scepticism and suspicion, often also hostility, and had to shoulder the blame for certain failures, although these failures may have been due more to methods of administration than to the principles of operation involved.

Gradually, however, industrial medicine in its broader conception as health supervision of workers proved itself sound in principle, scientific in its application and of large economic benefit because of its aid in preventing of illness and accident and in returning disabled workers to their jobs in the shortest possible time. Today, the work of the medical department in industry has won a high place in the respect and confidence of employers and employees. Employers who still lack faith in it are chiefly those who have not yet realized the possibilities of usefulness in the industrial physician beyond his function as a medical practitioner. Employees who still maintain a hostile attitude toward the medical department are usually those who either have not been properly educated as to the value of the work to themselves and to industry generally, or have been put into that attitude by tactless physicians or by agitators, or who are anxious to hide physical defects or unnecessarily prolong the period of disability for which compensation is paid.

Past experience indicates that industrial medicine of the future will tend to draw to its ranks in greater numbers those physicians of broad vision and scientific attainments who have a genuine interest in the social aspects of medicine as contrasted with the purely individual aspect. To such men and women industrial medicine will unlock the door into the broad field of preventive medicine and hygiene, for here the environment of large numbers of workers can be studied and supervised, and the fundamental principles of personal hygiene and preventive medicine can successfully be instilled in their minds both by teaching and by example.

The industrial physicians of the future will have the benefit of the past experience of those who have established this branch of medical practice and have done the pioneer work. They will have the added support and satisfaction of the approval which the community always gives to any constructive social work. Experience shows that, as their ability is proved, they command the attention of their employers and increasingly become qualified advisors in shaping the policies of industry.

II

EXTENT AND CHARACTER OF HEALTH SUPERVISION IN NEW ENGLAND INDUSTRIES

In order to determine the extent to which health supervision of employees was being practiced in the industries of New England, and to become familiar with the methods used in the administration of industrial dispensaries, their personnel and equipment, a study of ninety New England plants was made by the National Industrial Conference Board during the past summer.

The industries studied included abrasives, leather and tanning, metal trades, paper, rubber, shipbuilding, shoes, sporting goods and textiles. The number of plants visited in each industry varied from one to fifty. Together these plants employed 317,000 persons, of whom 221,500 were men and 95,500 were women. The plants were situated in different industrial centers throughout the states visited and may be regarded as representative of these industries in New England. They are located as follows:

Connecticut	30
Massachusetts	50
New Hampshire	4
Rhode Island	6

In each plant visited, the quarters and equipment of the medical department were inspected, the physician or nurse in charge was interviewed, and wherever possible some plant executive was seen with whom the question of medical supervision was discussed. The attached summary in tabular form shows the principal findings of this investigation:

NEW ENGLAND INDUSTRIES—MEDICAL DEPARTMENT STATISTICS

(National Industrial Conference Board)

INDUSTRY	Number Plants Visited	EMPLOYEES		PHYSICIANS			OCULISTS		DENTISTS		NURSES		
		Male	Female	Full Time	Part Time (*a*)	On Call (*b*)	Full Time	Part Time	Full Time	Part Time	Male	Female	Visiting
Abrasives	1	3,400	200	2	3				1			6	2
Leather	2	5,250	350	1	1	2					2	2	2
Metal Trades	50	128,795	36,130	13	38	20		1	2	3	15	74	7
Paper	4	5,025	2,475	1	2	1						10	1
Rubber	6	17,500	6,500	6	3	1	1		2	2	2	15	4
Shipbuilding	1	18,000	2,000	4							1	3	1
Shoes	2	3,200	3,800	1	1	1						2	1
Sporting Goods	1	660	340		1					1		1	
Textiles	23	39,700	43,700	9	14	4			2		2	42	9
	90	221,530	95,495	37	63	29	1	1	7	6	22	155	27

INDUSTRY	Other (*c*) Dispensary Employees	Number Requiring Physical (*d*) Examinations	RESPONSIBLE TO			LOCATION OF QUARTERS				
			Executive	Employ. Mgr. (*e*)	Insurance Company	First Floor	Second Floor	Third Floor	Fourth Floor	Outside (*f*)
Abrasives	1 CK	1	1							1
Leather	2 F. A. 1 CK	1	2				2			
Metal Trades	26 F. A. 20 CK	13	19	27	3	31	4	5	2	7
Paper	1 F. A.		2	1	1	2			1	1
Rubber	1 F. A. 8 CK	4	1	5		4		2		
Shipbuilding	4 CK	1		1						1
Shoes			1	1		1			1	
Sporting Goods				1		1				
Textiles	4 F. A. 9 CK	5	13	8	1	11	4	1	1	5
	34 F. A. 43 CK	25	39	44	5	50	10	8	5	15

(*a*) Often two or more in one plant.
(*b*) In addition to full-time and part-time men.
(*c*) Exclusive of ambulance drivers or janitors.
(*d*) In some cases to a limited extent.
(*e*) Includes personnel and welfare directors.
(*f*) In special building, office or service building.
CK—Clerk.
F. A.—First Aider.

QUARTERS

As the majority of industrial dispensaries were created to care for cases of injury occurring within the plant during working hours, their arrangement and equipment had been planned with this end in view. In no case, however, was a dispensary found that limited its work to industrial accidents. With few exceptions the tendency is to extend the work to other functions as rapidly as the need arises and the proper personnel can be secured.

The number of rooms varied from one to eight or ten. In most cases at least two or three rooms were used, although a large number of one-room dispensaries were found.

In the majority of plants the medical department was situated on the first floor, the next largest number being found on the second, third and fourth floors, respectively. In fifteen plants the dispensary occupied quarters outside the factory buildings, either in office buildings or service buildings.

In some large plants there was a lack of branch dispensaries which, had they been provided, would doubtless have enabled more prompt attention to injuries, with a reduction in the amount of time lost either through visiting the dispensary or by failing to visit it. This was shown clearly in two adjoining textile mills. One had 15,000 employees with one dispensary; the other had 1800 employees with one main and three branch dispensaries. In the smaller mill the number of dispensary visits was relatively seven times that of the larger mill.

EQUIPMENT

With few exceptions the dispensary equipment seemed adequate for the character of work that was being done. The following constituted the average equipment found in the smaller dispensaries:

Instrument and supply cabinet
Drug cabinet
Solution basins
Dressing table
Foot rest
Chairs
Sterilizer
Sink with hot and cold water
One or more cots

In addition there was usually found an operating table of simple design, a chair for eye cases and a tub for soaking foot injuries. Electric baking devices and single-bulb thermolamps were met with in many cases. In two plants a magnet equipment was found for removing particles of metal from the eye.

Thirteen dispensaries were equipped with X-ray machines. In the majority of cases light work only was done, such as long bone examinations. In a few places complete work was done, dental and abdominal skiagraphs, as well as those of long bones, being taken. In several plants all cases needing X-ray examination were referred to an outside physician. The tendency in such an arrangement is to send only the more serious cases to be examined, thereby neglecting a large number of apparently small but important injuries. The usual charge for such outside service was five dollars per picture.

In one dispensary the sinks were located in the center of the room where the nurses and doctors could work from both sides. One end of this same dispensary could be made into two semi-private examining and dressing rooms by means of wide curtains on rollers attached to a framework higher than a man's head. When not in use the curtains were rolled up out of the way.

In another busy dispensary the work was all done in one large room, but the equipment was divided into units, each with its own dressing table and other supplies and instruments. There were units for eye, nose and throat, infections, and general dressings.

In another dispensary with two full-time physicians, each doctor had a separate office fully equipped for all ordinary work, and saw each patient in the strictest privacy.

In one plant a well-equipped laboratory was found where both clinical and bacteriological work was being done. In several other plants urinalyses were made as indicated, but the laboratory equipment used was meagre.

In one large dispensary all first dressings of injuries are made in a room devoted to this purpose. The equipment and instruments used in this room are kept separate, and used here only, re-dressings being done in other rooms. The medical director reported that by this procedure infections were reduced to a minimum.

In one dispensary a "coryza room" was found. This was a booth about four feet square with a small electric stove and a vessel containing a solution of formalin, tincture of benzoin and aromatics which was heated until vapor arose. Any employee feeling that he was catching cold was at liberty to enter the booth and inhale the vapor for a few minutes. The physician at this plant advised that many colds had been aborted by this treatment. In this same department was a similar space where the employees could gargle their throats with antiseptic mixtures, thus further aiding in the early cure of colds and sore throats.

Drugs and Supplies

Iodine was the disinfectant most generally used, with chlorazene and bichloride of mercury next in order. One case was found where iodine was not used. Gasoline, benzine, ether, alcohol and green soap were the cleansing agents most commonly used, and in about the order named. One dispensary used a high grade denatured alcohol only and claimed perfect results with it.

Ointments used were a great many, with possibly unguentine encountered the most often and ichthyol second. In a few cases Balsam of Peru was used on old granulating wounds.

Chlorazene and bichloride of mercury were used most often for wet dressings. In six or seven plants Dakin's solution was used, but in one of these its use was not now so common as it was earlier in the year. Dichloramin-T was found in only one or two dispensaries.

Medicines dispensed varied from a few simple remedies for headache, colds, indigestion, constipation and dysmenorrhea to elaborate stocks. The general tendency seemed to be to reduce rather than augment the amount and kind of drug preparations given.

Methods

In only one or two plants was an attempt made to cover all lines of medical supervision. In the great majority of plants such work was confined to emergency medical treatment in order that the employee might remain at work. If too ill to continue at his job he was sent home and advised to call his physician. In many plants the visiting nurse followed up the case in order to see that proper medical attention was procured by the employee or his family. In a few plants only did the nurses attempt to give more than friendly advice and suggestions regarding the care of the patient. In many cases the nurses stress the educational side of their home visiting work, endeavoring to build up the general tone of the home and community life of their employees.

In only one plant was an attempt made to furnish complete medical care to employees and their dependents, and in this instance no obstetrical work was undertaken and night calls were answered only in cases of emergency.

In some cases the industries offer free treatment to employees and their dependents so long as they are able to visit the plant dispensary. In the majority of plants, however, the medical supervision work is confined strictly to emergency relief.

In one city there was found a hospital of 100 beds capacity, owned and administered by a group of local establishments. Employees of these establishments and their families had first call on the services of the hospital staff, but when beds were available the needs of the public were considered. Provision was made for all forms of hospital work. There were medical, surgical, obstetrical and children's wards, and a well-equipped operating room. A well-patronized out-patient department was also maintained. Each industrial patient paid a fixed sum for treatment in this hospital, and the member corporations were assessed for the deficit according to the number of employees in each plant.

On account of this arrangement small first-aid rooms only were being maintained in the mills that were members of this hospital corporation. This hospital is said to be the only one of its kind in the country.

PERSONNEL

In forty-four of the plants visited the medical department is responsible to the director of personnel, employment manager or other subordinate official. In four places a physician was in charge of the entire service department, which includes the medical work at the plant. In each of these cases one or more additional full-time physicians were attached to the dispensary. In thirty-nine cases the physician in charge of the medical work was directly responsible to the plant executive, and this arrangement seemed to work well.

Out of 120 physicians found to be engaged in industrial work, thirty-seven were devoting all their time to it. This number included the four service managers mentioned above. Sixty-three others were giving part-time service to the work, varying from one or two hours per week to four or five hours per day. Twenty-nine physicians were regularly on call. In only three plants were physicians on call, in addition to those on a full-time or part-time basis. In one plant a full-time oculist was found and in another place a part-time oculist and a full-time optician were employed. In one factory a full-time physician constituted the entire personnel of the medical department.

In many plants, particularly in those where the medical department was a branch of the industrial relations department, the scope of the physician's activities was generally confined to the dispensary. Curative measures were stressed rather than preventive work. There was little opportunity for his influence to be felt in other departments, such as safety and sanitation, proper placing of workers, etc.

PART-TIME SERVICE

Part-time health service found was of two kinds. Either one physician visited the factory at stated times, daily or less often, or two or more physicians were at the plant during different hours of each day, insuring continuous or almost continuous medical attendance during working hours. In practically all places where such an arrangement was in force the doctor confined his activities to seeing such cases as passed through the dispensary. Few of them visited the factory or made an effort to check up the employee and his job or to assist in the inauguration of accident or sickness prevention measures.

HEALTH SERVICE SUPPLIED BY INSURANCE COMPANIES.

In five plants visited, the personnel was supplied and paid by the insurance company carrying the compensation policy of the establishment. This included full-time physicians in two places, a part-time physician in another, and in two other cases the nurse or nurses were supplied and paid by the insurance carrier. In one of these plants, in addition to the full-time doctor, the nurses, a full-time dentist, equipment and all supplies were furnished by the insurance company. This physician made physical examinations of all applicants for employment.

DENTAL WORK

Dental work in factories had been introduced in a number of plants and was being considered in a still larger number. Seven factories employed a full-time dentist and, in addition, two part-time men; while five plants had dentists doing part-time work. The practice in this work was of three kinds, viz., free treatment; a moderate charge of twenty-five cents to fifty cents per treatment, depending upon the nature of the work done; and a fee from one-third to one-half below that regularly charged by dentists in their own offices. The character of work done varied from examinations alone to prophylactic work, and in one case covered all forms of dentistry, including crown and bridge work. An exceptional condition was found in one large mill where complete dental work by a full-time dentist was given free to all dependents of employees up to the age of 14. No employee in this mill was permitted to use the dental facilities. In two plants, each with fewer than a thousand employees, first-class dental equipment and half-time dentists were established.

PHYSICAL EXAMINATIONS

In twenty-five of the plants visited physical examinations are required, in some to a limited extent. One plant examines only those applicants who are over 40 years of age, another makes only eye examinations; still others have the men examined by a male nurse for hernia and other gross lesions. An increasing interest is being taken in this subject, and several firms have advised that they will introduce physical examinations at an early date. In keeping with the findings of the Conference Board of Physicians in Industry, little or no opposition to the examination was reported. In one large factory examinations had been discontinued with a change of policy from that of self-insurance to commercial insurance. With this change of policy the physician advised that the need for examinations no longer existed.

In the majority of places where physical examinations were required, some effort was made to tie up the results of the examination with the job for which the applicant was hired rather than to use the findings merely to weed out undesirable applicants.

Records

There was a lack of adequate records of the work of the dispensaries in many of the plants visited. In a few cases only were records found that were being used, or were capable of being used, to interpret the accident or sickness conditions in the plant. In one case the nurse advised that workers from certain departments were not permitted to visit the dispensary if a record of their visit was made. The reason for this extraordinary proceeding being that the cost of maintaining the dispensary was distributed among the departments in proportion to the number of dispensary visits by employees of each department. Needless to say, it was reported by the nurse that there were many cases of infection in this plant.

When the value of adequate records was shown, there was a willingness in many plants to adapt their present methods to suggestions made.

In a few cases rather complete records were kept, but were not utilized to their full value. In only one plant visited were the hospital records regularly published.

Social and Educational Activities

In many cases activities of a social character were being supervised by the medical department personnel. The nurse frequently served as matron and advisor to the female employees. In four plants day nurseries had been established under the supervision of the works physician. Certain functions in the administration of the mutual benefit associations were frequently delegated to the doctor or nurse. The works physician is frequently the one employed by the mutual benefit association to look after the welfare of its members. Sanitary supervision of toilets, lockers, rest rooms, cafeterias, etc., was frequently included in the duties of the medical personnel. In several instances the nurses made regular factory inspections, criticizing conditions found, the various departments being held up for comparison in order to stimulate improvement in the general sanitary condition of the plants.

In three plants the physician talked regularly to male employees, and the nurse to female employees on matters of personal and sex hygiene, home and community standards of living, etc. In addition leaflets touching on the same subjects were prepared for distribution in pay envelopes.

In one plant the physician and nurses carried on extensive prenatal work. All pregnant employees were sent away from the shop at the end of five month's pregnancy, and the physician and nurses gave them care and advice from then until time of delivery. The physician did not attend the case in delivery as the company doctor, but would take it as a private physician.

Physicians are frequently found on the athletic boards of the industries with which they are connected.

CONCLUSIONS

Judged by the experience gathered among New England industries, the value of certain phases of industrial medical work is quite fully recognized. With few exceptions plans were under way for an expansion of the work, either by adding to the quarters, the staff or the character of the work done. In many cases recent enlargement of the work had been accomplished. In one plant an eight-room department was being equipped to care for the work now being done in one room no larger than ten by twelve feet. There were other cases of a similar nature.

III

STAFF ORGANIZATION

The work of the physician in industry has been of gradual and slow development. At first he worked alone, usually seeing only the more serious cases, slight injuries being neglected or treated by fellow-workers. With the development of the work, nursing service was introduced, which resulted in the creation of dispensaries or first-aid rooms where the needs of the workers could be better met. As the scope of service was enlarged, further organization was found necessary in order to care for it properly.

Soon the need for standardization of the organization and work of the medical department became evident; but as the needs of the different types of industry were studied, it was seen that, for many reasons, the standardization of plant dispensaries was an impracticable matter. Chief of these is the fact that medicine is advancing so rapidly in its relation to industry that no hard and fast rules can as yet be laid down. What is adequate today, is insufficient tomorrow, as methods of industrial practice change. It has been found that if the medical department is functioning properly, its influence will extend more and more into the industrial organization, this extension making new and enlarged demands upon its resources. Its own organization will need to be altered to meet these demands. There are functions of a routine and clerical nature that can be discharged by clerical assistants, leaving the time of the physician free for the technical and professional work which has to be done. In a small dispensary a nurse frequently combines her nursing duties with those of keeping the necessary records. In larger dispensaries, especially when there are also first-aid rooms throughout the plant, it has been found of advantage to provide clerical assistance in sufficient amount to care for the routine work of the department.

The nature of the processes carried on, rather than mere numbers of workers, often determines the size of the medical staff. Industries having marked occupational hazards, and those in which there is much preventive work to be done, even though the number of employees is small, demand a larger medical staff than many other non-hazardous industries employing greater numbers of people.

Experience shows that the size of the medical department required and its personnel will vary also with the character of the work to be done. If only first treatments and re-dressings of injuries arising in the course of employment are given, a much smaller staff and quarters suffice than where all cases of injury as well as of illness during work time are cared for, and the facilities required are still greater when medical supervision is extended into the home life of the employee. In the latter instance the services of social workers and visiting nurses have been utilized in order to keep in touch with home and community conditions.

In practice it has been found advisable to enlarge this supervisory service gradually, so that the suspicion of the worker may not be excited, a condition which is hard to overcome once it has been aroused. Experience has taught that where additions to the welfare activities of an industrial organization are advisable, they should be made preferably at the request of the workers and with their full knowledge and support. Otherwise the desired ends may not be accomplished.

Studies indicate that the location of the industry has a bearing on the size of the medical staff required. Industries located in or near cities and towns with ample hospital and medical facilities and skilled physicians available in case of need, do not require so extensive a medical staff as those situated in more isolated sections of the country. In the latter case a staff capable of meeting the emergencies as well as the daily needs of the organization must be maintained.

In many plants the addition of a dentist to the staff and the inclusion of facilities and equipment for dental work have proved a distinct advantage, for the largest single defect of workers is that of their teeth, and many obscure ailments are referable to diseased mouth conditions. Service rendered by the dentist may range from examination alone to permanent treatment of the teeth. This service is rarely supplied gratis, as the condition of the worker's teeth seldom arises from his employment. Charges are usually based either on the cost of materials used, or on a fee schedule somewhat below that charged in private practice, but at times the service is provided free by the company. In some cases the necessary dental work is done on the employer's time; in other cases, although treatment is given at the plant during working hours, the employee loses the time so spent.

The personality of members of the medical department is of great importance, and their selection should be given most careful consideration. Many persons have a dread of contact with medical men or medical equipment. If the industrial visitor to the dispensary meets with a spirit of helpfulness and personal interest in his case, he will, to a large extent, be disarmed of his fears and suspicions. Employees will come for treatment without hesitation, with the result that better and quicker treatments can be given.

Investigations have shown that there are a number of industrial establishments with about 300 employees in each which employ a full-time trained nurse and a physician on call, or on part time. While some establishments with 500 or more workers employ a physician on a part-time basis, others have found it entirely practical to employ a physician for full time, in addition to the trained nurse; and some plants with 1000 or more workers employ both a physician and a nurse or nurses on full time. In very large plants one full-time physician to every 2000 employees, together with the necessary nurses and clerical assistants, has been found to be a workable arrangement. These ratios and limitations are varied to meet the needs of particular industries, but they will serve as indications of the medical personnel now being provided in many plants.

Even small plants employing 100 or less workers, of which there are a very large number, have the duty of conserving the health of their employees during working hours. Arrangements can be made either to bring a physician into the plant at stated times or to send employees and applicants for employment to the office of a physician for examination and treatment when required.

Where the number of workers or the absence of occupational hazards in a plant make the entire time of a physician unnecessary, it has been found advantageous for a group of such plants to combine in providing dispensary facilities for their employees. In this way the full time of a competent physician and needed assistants is utilized and the cost is distributed pro rata among the supporting industries.

When a group of industries establishes a central medical department and jointly employs a full-time physician, opportunity is afforded to the physician to make medical or health surveys and investigations having to do with the correction of faulty plant conditions and the prevention of accidents and losses in work time. His functions then approximate those of the industrial physician who devotes all his time to the service of one plant.

Where an individual plant uses only a part of the time of a practising physician, his duties are limited usually to the treatment of such cases as are brought to him, with incidental advice on such matters as come to his attention. His interest is divided between his private practice and his industrial work, and though he frequently brings into the plant a higher type of medical skill and proficiency than the full-time physician, this advantage is usually offset by the industrial disadvantage of the lack of continuing health supervision of employees by a physician who, within the plant, learns to appreciate and properly evaluate the needs of industrial operation. Yet, some excellent part-time medical work is now done, and, in any event, part-time medical supervision is better than none. A part-time doctor with the proper industrial viewpoint should, moreover, be able to convince his employer of the practical value of full-time medical service in industry.

IV

EQUIPMENT

The Plant Dispensary

In many plants the dispensary is located on the ground floor, convenient to the entrance to the plant. In other places, where elevator service is available, it is situated above the ground floor. In the latter case, a location near the elevator has been found desirable, if this permits of proper ventilation and lighting, easy access to wash and toilet rooms, and necessary quiet. It should be remembered that it is always easier to take an injured or ill person down stairs than up stairs, and this fact should largely determine the location of the dispensary on the ground floor, if suitable space is there available.

In some plants the work of the medical department has been facilitated by the provision of additional space for office and record equipment, preferably adjoining or near the dispensary.

As most treatments are given during working hours, and as the worker is away from his job while visiting the dispensary, it has been found well to locate it in a fairly central place, to avoid waste of time in traveling to and from it. It is equally important that provisions for treatment be such as to require the least loss of time in dressing injuries. Consequently, much thought should be given to the kind and convenience of location and equipment of plant dispensaries. It is desirable that dressing tables, instruments and dressings, sinks and waste receptacles be placed with a view to quick and efficient treatment of cases.

It is found in practice that many serviceable arrangements of equipment are made to meet requirements of available quarters or the ideas of works physicians. In field studies of industrial medical departments several interesting adaptations of the medical work have been found. As described above, in one dispensary the sinks are located in the center of the room where the nurses and doctors can work from both sides. This has been found a decided advantage in a busy place. One end of this same dispensary can readily be made into two semi-private examining and dressing rooms by means of wide curtains on rollers attached to a framework higher than a man's head and supported from the ceiling. When not in use, the curtains are rolled up out of the way.

In another busy dispensary already mentioned, all of the work is done in one large room, but the equipment is divided into units, each with its own dressing table and other supplies and instruments. There are units for treatment of the eye, nose and throat, infections, and general dressings.

In another dispensary with two full-time physicians, each doctor has a separate office fully equipped for all ordinary work, so that each patient can be seen in the strictest privacy. This method entails duplication of equipment not necessary in plants having one general dressing room.

In one plant a well-equipped laboratory is installed for both clinical and bacteriological work.

In one large dispensary noted in chapter II, all first dressings of injuries are made in a room devoted to this purpose, with separate equipment and instruments used here only, redressings being done in other rooms. In this way, it is reported, infections are reduced to a minimum.

BRANCH DISPENSARIES

In plants with large numbers of workers or those covering considerable territory, it has been found desirable to install branch dispensaries in charge of trained nurses, the works physician having regular visiting hours, in addition to being always on call. These branch dispensaries enable more prompt attention to injuries, with a reduction in the amount of time lost either through visiting the more distant main dispensary or by failing to visit it. The advantage of branch dispensaries has been shown clearly in the work of two adjoining textile mills, cited previously. One has 15,000 employees with one dispensary; the other mill has 1800 employees with one main and three branch dispensaries. In the smaller mill the number of dispensary visits was relatively seven times that of the larger mill.

Physicians in industry assert that each establishment should have a sufficient number of branch dispensaries to reduce to a practical minimum the time lost by an employee when visiting the dispensary.

Some large industrial establishments are located in remote sections where no hospital or medical facilities are available. In such cases it has been found necessary to provide facilities for complete medical and surgical care; but these larger hospital organizations cannot take the place of the plant dispensaries, which must be maintained to effect closer and quicker contact with employees injured or ill. Under such circumstances the hospital becomes a community rather than a purely industrial asset, and the most valuable work, in a measure, is that of the branch dispensaries in the shops.

First-Aid Room

In some industrial establishments not large enough to require a fully organized dispensary as outlined in previous pages, it has been found desirable to equip a room where first-aid treatment can be given. Such a room may be in charge of some one with first-aid training, or a trained nurse. Its use contemplates activities of a more technical character than those called for in administering the first-aid instructions noted elsewhere in this report.

To assist in the improvement and standardization of emergency treatment in industrial establishments, the Conference Board of Physicians in Industry has established minimum requirements for the size and equipment of the standard first-aid room, as follows:

> A first-aid room should be not less than 9′ x 12′ in size, should be well lighted and ventilated, should have running water—hot as well as cold, if possible—should be provided with toilet facilities in or near the first-aid room. The light should be particularly good at the point where first-aid service is to be rendered, where an adjustable electric lamp would be very serviceable and convenient. Aside from ordinary good ventilation, it is desirable to arrange for a large inflow of air by fans or otherwise, to stimulate patients when feeling faint. The ceiling and walls should be light in color and frequently cleansed.
>
> The room should contain the following minimum equipment:
>
> 1 metal combination dressing table with drawers to hold instruments and dressings.
> 1 metal chair with head and arm rest.

1 metal stool built in combination with metal waste can.
1 small wooden or metal examination table with pads, with ends hinged to drop down.
1 stretcher, of the army type (canvas stretched over two round wood poles) or one of metal.
1 small instrument sterilizer arranged for electric, gas, alcohol or kerosene burner.
½ dozen utensils, such as arm and foot basins, 3-or 4-quart ordinary basins, 2-quart dipper, bed pan, etc.
1 portable first-aid outfit (see page 29).
Appropriate instruments, including razor.
Dressings; splints; drugs.

In practice the equipment in such a room has been found sufficient to meet the needs of a small plant dispensary, and the first treatment and re-dressings of minor injuries can be done here successfully by a trained nurse or physician. It will be found rather too small to care for a large number of cases daily, but in many instances it has proved adequate for the needs of the smaller establishments.

SPECIAL EQUIPMENT

Investigations show that equipment for X-ray work is found increasingly useful in industrial medical practice. With foreign bodies in the flesh, in fractures, and in dental work it is proving of great value. The psychological effect upon the employee has been found decidedly favorable, especially in cases of doubt as to the nature of the injury.

In some industrial plants, cases needing X-ray examination are referred to outside physicians. The natural tendency in such an arrangement is to send only the more serious cases to be examined, thereby neglecting adequate examination of a large number of apparently small but important injuries. Besides, this practice often proves in the end as expensive, and sometimes more costly, than the installation of an X-ray outfit. X-ray equipment is now available which combines simplicity of construction and ease of operation with a moderate price, thus making it possible for each plant to have its own. With such equipment a large number of small injuries can be studied by fluoroscopic methods, thereby obviating the necessity for more expensive plate exposures.

SUPPLIES

When considering the medicines and supplies necessary for the industrial dispensary, experience advises limiting the number of these to the fewest possible, both as a measure of economy and to save space. Where only emergency and first treatments for ill persons are given, one or two simple remedies for headaches, colds, constipation and associated conditions usually meet all requirements. For surgical dressings, iodine solution, a mild antiseptic such as boric acid, a stronger one such as some chlorine compound, a solution for a simple wet dressing, physiological salt solution (.7%) and one or two ointments, practically cover the field. If more extended medical or surgical treatment is necessary, hospitalization of the patient is indicated. The number of bandages, dressings, splints, and other appliances and instruments needed depends upon the kind and amount of work done in the dispensary.

FIRST-AID OUTFITS

Where there are one or more dispensaries in a plant and these are in close proximity to the work rooms, it has been found advisable to have all injured or sick employees report to the dispensary for dressings or treatment rather than resort to first-aid measures in the work rooms. If first-aid outfits are available in work rooms, employees will frequently not visit the dispensary for treatment of small injuries but will indulge in self-treatment, which is often insufficient or of the wrong kind. Many cases of infection develop from inadequate self-treatment or from the neglect of small injuries, with the result that much more work time is eventually lost than if the injured worker had gone to the dispensary when the injury first occurred.

Sometimes plant conditions make the distribution of first-aid outfits throughout the departments advisable. In that case, however, it has been found best to locate these outfits in the office of the superintendent or foreman, and to have either these persons or their clerks properly instructed in methods of first-aid work and enjoined, above all, to give only such treatments as properly fall within the limits of first-aid practice. The value of such an arrangement is predicated on the works physician having full charge of all of the first-aid outfits and first-aid men, and following closely the work of the latter. In one large establishment first-aid jars are placed in every department under the supervision of the foreman or a clerk who has had training in first-aid work. Slight injuries are treated here, and a record card showing the nature of the injury and the treatment given is promptly sent to the works physician so that he may keep in touch with these minor accident cases and if, in his judgment, it is advisable, have them further treated in the dispensary. By the provision of such first-aid facilities in this plant it has been found that many employees seek treatment for slight injuries who would not take time to visit the plant dispensary.

Where departments operate at night when the dispensary is closed, or where no dispensary is maintained in the plant, first-aid outfits in work rooms become a necessity.

Wherever used, first-aid outfits should be kept available in a clean place, preferably in the office of the superintendent or foreman, and they should be in charge of some employee or employees who have been instructed in the application of first-aid measures. The contents should be replenished as soon as used, and when infrequently used should be regularly inspected and deteriorated supplies replaced.

The Conference Board of Physicians in Industry has, as result of long experience, recommended the following as a standard adequate supply of first-aid materials which covers practically all state legal requirements:

1 Tourniquet.
1 Pair scissors.
1 Pair tweezers.
1 Triangular sling.
1 Wire gauze splint.
1 Teaspoon.
12 Assorted safety pins.
1 Metal cup.
1 Medicine glass.
2 Medicine droppers.
3 Paper drinking cups.
First-aid record cards.
1 2-oz. bottle castor oil.
2 3-oz. tubes burn ointment.
1 2-oz. bottle 3% alcoholic iodine.
1 2-oz. bottle white wine vinegar.
1 2-oz. bottle 4% aqueous boric acid.
1 2-oz. bottle aromatic spirits of ammonia.
1 2-oz. bottle Jamaica ginger (or substitute).
1 Piece flannel, 24 in. by 36 in.
1 Roll absorbent cotton (1.5 oz.)
1 3-in. by 10-yd. gauze bandage.
1 2-in. by 10-yd. gauze bandage.
2 1-in. by 10-yd. gauze bandages.
1 Spool 1-in. by 5-yd. adhesive plaster.
6 Sealed pkgs., 6-in. by 36-in. sterile gauze.

V

FIRST-AID WORK

The enactment of workmen's compensation laws made it necessary for industry to provide for the treatment of accidents occurring in the plant. But even before this, many plants had facilities for rendering first aid to injured workers. These facilities usually consisted of bandages, gauze dressings and possibly an antiseptic solution contained in a compact portable case. The inclusion of a manual of first-aid practice was quite common. These manuals, and others of their kind, contained detailed instructions on what to do, and what not to do, for a large number of conditions. It required considerable time to locate the proper instructions in such manuals, and when located, the instructions were so comprehensive that the essential features were often overlooked in searching for the right thing to do at the right time.

As medical work in industry developed, and doctors and nurses became available on short notice, the need was eliminated for extensive treatments of workers by one of their number. There remained, however, the necessity for simple and concise instructions for first-aid measures that could with safety be applied among the workers in the plant.

Standard First-Aid Methods

With the idea of eliminating much of the unessential material found in first-aid manuals, and substituting therefor simple, positive directions for treatment of the large number of minor accident cases encountered in industrial work, the Conference Board of Physicians in Industry early in its work considered methods of industrial first-aid treatment. Tentative methods were proposed and given a comprehensive trial in various plant dispensaries. Results observed were noted and discussed at subsequent Board meetings. The methods were revised and used for some time, and when they were again brought up for discussion it was found that the opinion of the members was practically unanimous as to their value. After about five years these methods were again discussed in the meeting of November, 1919, at which time the Board reaffirmed its position regarding their continued use. Thus it is seen that, as here presented, these instructions have stood the test of several years of industrial practice in many establishments under various conditions.

These instructions for first-aid treatment are of such character that they can be followed by the ordinary man without any special preparation for first-aid work. They are concise and to the point, leaving out all references to the reasons for the action indicated. Remedies recommended have been reduced to the minimum, are simple and inexpensive and can be administered without much danger of harm. All needed materials are readily obtainable in drug stores.

To some the brevity of these first-aid instructions may seem to be a disadvantage. On the contrary, it has been found in industrial practice that this brevity is an advantage, since it avoids waste of time and secures directness of action. Cases of illness or accident beyond the scope of first-aid treatment can readily be taken to the plant dispensary, or a physician or nurse can be summoned from there or from outside on short notice. These instructions are intended only for laymen who are called upon either to attend to minor injuries or ailments and thus prevent their development into more serious cases, or, in case of serious accident, to apply emergency measures for the safety and comfort of the patient until he can be placed in the hands of the physician. The training and experience of the physician will then dictate the proper treatment, and a physician can usually be secured on short notice. In this respect industrial first-aid practice differs from that obtaining in mines or other places, where first-aid is the only medical attention the patient may be afforded for some hours.

STANDARDIZED FIRST-AID TREATMENT OF INJURED PERSONS

1. Treatment of Injuries Which Do Not Bleed:
   (such as contusions and sprains)
   - (a) Use several layers of sterile gauze or cotton, placed directly on the injured part.
   - (b) Apply bandage; use nothing else.
   - (c) Place the patient at rest and elevate the injured part.
2. Treatment of Injuries in Which the Skin is Broken:
   - (a) Drop into the wound a 3% alcoholic iodine solution. Use it freely, but do not use it on the dressing.
   - (b) Apply a sterile gauze compress and bandage.
   - (c) In case of excessive bleeding proceed as under "Treatment of Hemorrhage."
3. Treatment of Hemorrhage:
   - (a) Place the patient at rest and elevate the injured part.
   - (b) Place a pad of sterile gauze over the bleeding spot, large enough so that pressure can be applied above, over and below the wound.
   - (c) If bleeding does not stop, apply a tourniquet between the wound and the heart, using for this purpose a belt, shoe string, cord or suspender if regular tourniquet is not available.
4. Treatment of Nose Bleeding:
   - (a) Maintain the patient in an upright position and elevate the arms.
   - (b) Get the patient to breathe gently through the mouth.

   Caution: Do not attempt to blow the nose.
5. Treatment of Foreign Substances Located in the Body:

   Do not attempt to dig out any foreign bodies, no matter how small, from any part of the body. (See below for eye injuries.)
6. Treatment of Burns, Scalds, Etc.:
   - (a) Do not open blisters.
   - (b) Apply burn ointment—3% bicarbonate of soda (baking soda) in vaseline.
   - (c) Apply several thicknesses of clean gauze and bandage lightly.
7. Treatment of Acid Burns:
   - (a) Get the patient under a shower bath as soon as possible and thoroughly flush the parts to remove all further damage from the acid.
   - (b) After the acid has been thoroughly washed off, dry and apply burn ointment—3% bicarbonate of soda (baking soda) in vaseline.
   - (c) Cover wound with plenty of sterile gauze and bandage lightly.

STANDARDIZED FIRST-AID TREATMENT OF INJURED PERSONS—*Continued*

8. Treatment of Alkaline Burns (such as from lime, plaster, potash and ammonia):
    (a) Get the patient under the shower bath as soon as possible and thoroughly flush the parts to remove all further damage from the alkali.
    (b) After the alkali has been thoroughly washed off, flood the part with vinegar or milk and apply burn ointment—3% bicarbonate of soda (baking soda) in vaseline.
    (c) Cover the wound with plenty of sterile gauze and bandage lightly.

9. Treatment of Electrical Burns:
    (a) Apply burn ointment—3% bicarbonate of soda (baking soda) in vaseline.
    (b) Cover wound with plenty of sterile gauze and bandage lightly.

10. Treatment of Unconscious Patients (Any cause):
    (a) Lay patient on the belly with the face turned to one side.
    (b) Loosen all tight clothing.
    (c) Do not give anything to drink.
    (d) Call a doctor as soon as possible.
    (e) If breathing has stopped, proceed with artificial respiration as described under prone pressure method of resuscitation.

11. Treatment of Eye Injuries:
    (a) No attempt should be made to remove a foreign body *stuck* in the eye.
    (b) In case of foreign body in or injury to the eye, apply clean gauze and bandages.
    (c) In acid burns, freely wash out with water and put in 3% bicarbonate of soda (baking soda) solution.
    (d) In alkaline burns (from lime, plaster, potash or ammonia) wash out with boric acid solution or vinegar.
    (e) Visit the doctor at once.

12. Treatment for Suffocation and Electric Shock:

    Proceed with prone pressure method for artificial respiration, adopted by the Commission on Resuscitation and described below.

13. Resuscitation from Electric Shock:

    Proceed with prone pressure method for artificial respiration, adopted by the Commission on Resuscitation and described below.

Prone Pressure Method of Resuscitation

Immediately free patient from electrical circuit, using every care to protect one's self against electric shock. Then if patient is unconscious, even if he appears dead, lay him on his belly with arms extended forward, turn his face to one side, remove false teeth, tobacco, etc., from his mouth and draw his tongue forward.

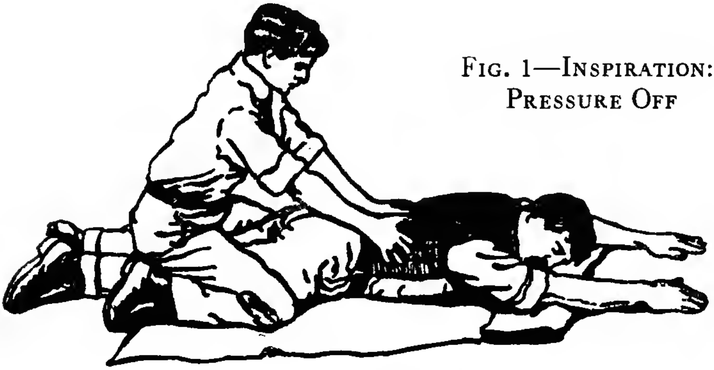


FIG. 1—INSPIRATION: PRESSURE OFF

Kneel, straddling patient's thighs, facing his head, and resting your hands on his lowest ribs. Swing forward and *gradually* bring weight of your body upon your hands and thus upon patient's back, then immediately remove pressure by swinging backward. Repeat this movement about twelve times per minute without interruption for hours if necessary, until natural breathing has been started and maintained.

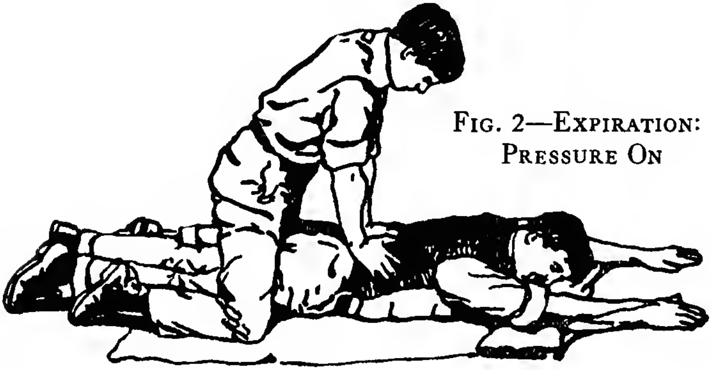


FIG. 2—EXPIRATION: PRESSURE ON

Meanwhile send for a doctor, have patient's tight clothing loosened, keep him warm and provide plenty of fresh air. Do not give patient liquids by mouth until he is fully conscious.

GENERAL PRINCIPLES OF FIRST-AID WORK

For those in industry having the direction of first-aid work the following explanations of the foregoing instructions are given, together with a discussion of some of the more important general rules of first-aid practice:

Injuries

All injuries should be considered as possible foci of infection. All wounds in which the skin is broken are open to infection if not properly handled. Wounds with an unbroken skin are safer to treat than those in which the skin is broken. These simple statements determine to a large extent the lines that successful treatment must follow.

It has been found in practice that the best treatment—first-aid and otherwise—of wounds that do not bleed, such as bruises and contusions, is to bandage the injured part snugly and place it at rest in an elevated position. Owing to a disturbance of the blood-control mechanism in the wounded area, there is a tendency for an excess amount of blood to accumulate there. This causes swelling and pain from increased pressure in the injured part. The bandage assists in the prevention of swelling, and by elevating the part, less blood will find its way there. This treatment will enable the injured tissues to return to normal in the shortest possible time.

Wounds in which the skin has been broken should be considered as already infected and treated accordingly. Iodine in 3% alcoholic solution has been found to be the best wound disinfectant for general purposes. It should be applied freely to the wound and the skin immediately surrounding. Then apply a dry sterile gauze dressing and bandage. No iodine should be placed on the dressing, as it is poisonous if absorbed in any quantity. It has no healing properties, and its work is done when it has rendered the wound sterile. The dressings, if properly applied, will maintain sterility of the wound without the danger attending the continued use of the iodine.

Hemorrhage

If a blood vessel has been cut, causing excessive hemorrhage, the patient should be kept quiet and the injured part elevated. Copious bleeding tends to carry to the surface any foreign matter or dirt that may have entered at the time the wound was received, and thus helps to cleanse the wound. A pad of sterile gauze considerably larger than the wound should be applied so that pressure can be made above, over and below the wound. In this way bleeding can be controlled by pressure on the gauze pad.

If this does not control the hemorrhage, a tourniquet should be applied between the wound and the heart. It is best to use non-elastic material such as shoe string, belt or cord for this purpose. Elastic materials are not reliable. If old, the elasticity is gone, due to the deterioration of the rubber. If new, the elastic will tend to pinch and cut the flesh, causing additional injury. The tourniquet should be resorted to only as a final means, and it should never be maintained in position longer than twenty or thirty minutes at a time. As mentioned previously, the loss of moderate amounts of blood can do no harm, but instead is rather beneficial, as the wound is being cleansed by the outward flow of blood.

Nose Bleeding

In cases of nose bleeding the patient should either sit or stand erect and hold the hands above the head. He should never blow the nose, and should breathe gently through the mouth. Vigorous exercise should not be taken for some time following an attack, as such activity may cause a return of the bleeding.

Removing Foreign Substances

Serious injury is often done by trying to remove foreign substances from any part of the body. Many wounds that would otherwise escape infection are infected by trying to dig out splinters and slivers. Unless they are causing an undue amount of pain, or can be removed without further irritating the wound, a sterile gauze pad and light bandage should be applied by the first-aid attendant and the patient sent to the doctor who can remove the foreign body under sterile conditions. This subject is further discussed under treatment of eye injuries.

Burns

No matter what the degree, the first-aid treatment of burns is the same. An ointment of 3% bicarbonate of soda (baking soda) in vaseline should be applied to the burned area and covered with several thicknesses of sterile gauze. A light bandage should then be applied and the patient sent to the dispensary or hospital as directed by the doctor or nurse. If blisters have formed they should not be opened.

Acid and alkali burns should first be washed freely with water to remove all traces of the chemical. In case of acid burns the application of the alkaline bicarbonate of soda ointment to the affected part will tend to counteract the acid. In alkali burns, after washing in water it has been found to be a good plan to flush the burned area with white wine vinegar in order to further neutralize the effect of the alkali. Then the bicarbonate ointment should be applied as for other burns.

The emergency treatment of electrical burns is the same as for any other burn.

Treatment of Unconscious Persons

If a person is rendered unconscious from any cause, he should be placed on his stomach with the face turned to one side. False teeth, tobacco, etc., should be removed from the mouth and all belts and bands and other constricting apparel, such as corsets, should be loosened. If there is no visible wound and the patient is breathing regularly, he should be left alone and the doctor called at once. If breathing has stopped, artificial respiration should be begun as described under the prone pressure method of resuscitation (see page 34). Under no circumstances should an attempt be made to give an unconscious person anything to drink.

Eye Injuries

Eye injuries should be handled with the greatest caution by first-aid attendants. Lost sight can never be restored, and this fact requires the greatest possible care in dealing with wounds of this organ. A layman should never attempt to remove a foreign body stuck in the eye ball. If a particle is loose in the eye it may be removed with a piece of absorbent cotton wrapped around a toothpick and dipped into boric acid solution before applying to the eye. It is always better to apply a sterile gauze pad and bandage and visit the doctor at once. In case of acid burns the eye should be washed freely with water, and a 3% solution of bicarbonate of soda dropped in the eye. In alkali burns the eye should be washed freely with water and then with boric acid solution. Sterile dressings should then be applied and the patient sent to the doctor at once. Patients should be cautioned against rubbing the eye with the hand or a handkerchief, as infection may be transmitted to an injured eye from the unclean hand or cloth.

Suffocation and Electric Shock

When a person has been rendered unconscious from suffocation or electric shock, he should be removed from the immediate place where the injury occurred to a safe place, and if breathing has ceased, artificial respiration by the prone pressure method should be resorted to. This treatment should be continued for hours if necessary, as frequently a person is to all appearances dead, but there is enough mechanical exchange of air in the lungs by the pressure treatment to finally restore breathing and the other vital functions, thus saving the life of the injured. *Do not give up too soon*—in no case before the arrival of the doctor. The use of complicated mechanical appliances for the restoration of breathing is not recommended by the Conference Board of Physicians in Industry, as more satisfactory results have been obtained in actual practice by the prone pressure method outlined previously.

In the foregoing pages an explanation of some of the more important rules of first-aid treatment have been given. This point should be emphasized, however: The less done to an injury beyond that which is absolutely necessary before the arrival of a doctor, the better will it be for the injured person. The rules should be followed as laid down. Any injury, however small, is not to be experimented with.

VI

PHYSICAL EXAMINATIONS

PURPOSE AND VALUE OF EXAMINATIONS

The purpose of physical examinations in industry is to assist the management in placing the worker in occupations for which he is physically suited. Without the information that these examinations supply, workers must needs be placed in jobs which they say and think they can perform best, regardless of the fact that such work may be attended by serious results to their physical well-being. By means of the physical examination many defects unknown to the worker will be brought to light. Many cases of defective vision, potential hernias, heart lesions, kidney disease, tuberculosis, etc., have been found in workers who were ignorant of their presence until revealed by the examination. To have permitted these workers to enter certain employments, would have made them not only a danger to themselves, but also to other workers and to the property with which they would have been entrusted.

By placing workers in jobs which, because of physical qualifications as well as those of knowledge and training, they can do best, it has been found that labor turnover is lessened, accidents are minimized, absence reduced, production and earnings increased, and that there is a greater feeling of contentment and satisfaction with his work on the part of the employee.

It has been found that where the physical examination is properly employed the handicapped worker is assured fair treatment. His defects and limitations are determined and his job assignment made accordingly. Previous to the introduction of physical examinations such workers were unable to secure permanent employment because their handicap was never studied with the idea of fitting the employment to the worker. A certain proportion of the floating labor population was drawn from the ranks of the handicapped workers. Sooner or later they became a charge upon the community and furnished recruits to the ranks of dissatisfied and radical elements. By keeping in mind the three reasons for rejecting an applicant for employment, viz., the danger to himself, to others, or to property, it has been found necessary to deny employment to only a very small percentage of workers.

In plants where records have been kept, an average of from three to five per cent of all applicants examined have been refused employment because of physical defects (see page 51). The percentage of rejections depends to some extent upon the character of the work done. But in almost any industrial establishment there are a few positions where the loss of an arm, or leg, or eye, or defective hearing, or a bad heart, or other similar handicap is no bar to employment. Experience has shown that the physical examination selects, as no other means can, the persons best suited to such work.

Yet employers willing to hire physically handicapped workers are often penalized by the interpretations placed upon workmen's compensation laws in certain states. These interpretations are to the effect that if a worker already partially disabled by the loss of an eye or hand or foot suffers the loss of a corresponding member, the employer is responsible for the total disability, even though the first accident occurred before the worker entered his employ.

In practice it has been found that when making the physical examination the physician is able to detect cases of communicable disease, and by the institution of proper measures prevent their introduction into the plant. Corrective measures for such defects as flat feet, impaired hearing and vision, decayed teeth and other abnormalities, either anatomical or functional, can be instituted when the physical findings are available. When the worker sees that a sincere effort is being made to improve or cure his defect, in the meantime making the best possible use of his services, rather than denying him employment on account of his defect, he will be more likely to square his mental attitude with that of the industry with which he is connected.

The method of examining the applicant is suggested by the requirements to be met. Special tests of vision or hearing require no disrobing. For the purpose of a general examination it is the practice in many cases to have the applicant strip to the waist for inspection of the chest, and to permit, when required, a full inspection of the hips, legs and feet. The employment of women for many lines of work, done formerly by men only, renders their physical fitness for the work a matter of prime concern. Where their work is co-ordinate with that of men, or occupational hazards are present, it has been found advisable that their examination be comparable to that of men.

When dealing with women employees or applicants it has been found desirable in many cases to provide a physician of their own sex. Many women physicians are temperamentally adapted to this kind of work; their employment also has a favorable social reaction. To have a nurse in the room when an examination is conducted by a male physician allays the fears of the one being examined and protects the physician in case subsequent controversy should arise.

When the employee understands that by submitting to a physical examination he will gain much information of value to himself, as well as enable the management to use him most effectively in the organization, and that, above all, his health and well-being will be protected, he rarely interposes objections. It has been found that marked objection to the examination on the part of the applicant or employee is usually based upon the fact that the worker is either diseased or defective and does not want this fact known, or that he is of such a temperament as to object to any procedure out of the ordinary. When such an individual is encountered it has been found advisable not to insist too strongly upon an examination, as in the one case his physical condition would render him unsuited for service, and in the other case future trouble might be averted in the establishment by refusing such a person employment.

STANDARD METHODS OF EXAMINATION

Early in the work of the Conference Board of Physicians in Industry the question of physical examination of workers was discussed and the need for such work and the benefits to be derived from it were emphasized. The outcome of these deliberations was the adoption of standardized methods of physical examination. These methods were subjected to long and thorough trials in industrial practice by members of the Board and others before receiving its official sanction.

The outline submitted herewith is intended to form a basis of examination that will cover the essentials so far as industrial workers are concerned, although the needs of the individual plant making use of this outline may suggest certain modifications in practice. This outline has not aimed to cover every detail as laid down in text books on the subject, but attempts to present in a concise and logical manner those items that will be found of major importance in securing the needed information for placing the worker effectively.

In conducting the examination the standardized method as presented may be found, and probably will be found, more exhaustive than the needs of the particular industry demand. In many cases and for many purposes only a partial examination has been found necessary. In other instances it has been found advisable to add to the procedure as here outlined in order to determine the facts. If, however, the outline as submitted is followed, few if any defects having an industrial bearing will be overlooked by a competent physician.

It is important to keep in mind the difference between the purpose of industrial physical examinations and those made in hospital clinics and dispensaries. In the former case persons in at least a fair degree of health are examined for a definite and special purpose, viz., proper placement in industrial work; in the latter case persons who have, or think they have, some physical ailment are examined in order to determine the nature and extent of their disability. In this case a more complete examination and record of physical findings is necessary in order to reach a correct diagnosis.

In the last analysis, much depends upon the examiner. In the hands of an incompetent person not capable of interpreting his findings, the most complete outline possible will be of little or no value as regards the making of such examination service efficient.

STANDARDIZED METHOD OF PHYSICAL EXAMINATION

(It should be understood that in many cases and for many purposes a partial examination only will be necessary, and that, barring special cases, the examination would need to consume only an average of from 6 to 10 minutes per person. It is also understood that the procedure may be added to or subtracted from as the peculiar requirements of each industry may make advisable in the judgment of the examining physician.)

1. Special Senses
    - (a) Eye
    - (b) Ear
    - (c) Smell
    - (d) Speech
2. Chest
    - (a) Heart
    - (b) Lungs
3. Abdomen
    - (a) Hernia
    - (b) Tumors
    - (c) Liver
    - (d) Kidneys
    - (e) Stomach
    - (f) Intestines
    - (g) Spleen
4. Anus
5. Genitals
6. Limbs
    - (a) Muscles
    - (b) Nerves
    - (c) Blood vessels
7. Feet and Toes
    - (a) Deformities
    - (b) Flat Feet
    - (c) Varicose Veins
8. Hand and Fingers, Right and Left
    - (a) Deformities
    - (b) Grip
9. Nervous System
    - (a) Muscle reflex
    - (b) Superficial reflex
    - (c) Tabes
    - (d) Sclerosis
    - (e) Tremors
    - (f) Fits
    - (g) Tics
    - (h) Prior diseases and accidents
10. Mouth
    - (a) Teeth
    - (b) Tongue and tonsils

SPECIAL SENSES

Examination should include:

(a) EYES:

Visual Acuity: Right Eye:......... Left Eye:........

Visual acuity of 20/40 or less in both eyes should indicate specified employment and further investigation.

Visual acuity of less than 20/30 in any eye and less than 20/200 in other, with suitable correction should indicate specified employment.

A great disparity in vision of the two eyes should indicate need for further investigation.

STANDARDIZED METHOD OF PHYSICAL EXAMINATION—*Continued*

Reading Test: Right Eye:.................. Left Eye:..................
........................Size of type................................
........................Distance ....

Field of Vision: Right Eye:................ Left Eye:..................
....................Normal or limited........................

Loss of more than one-third of field of vision of both eyes, or loss of two-thirds of field of either eye should indicate specified employment.

Color Sense: Ability to match colors and call them correctly.
Pupils: Reaction.
Retina and Fluids by opthalmoscope.

(b) Ears:
Drums: Right Ear:................ Left Ear:..................
........................Appearance................................
....................Hearing power............................
....................By watch ....
....................By conversation..........................

(Whispered voice at 20 feet away or Ingersoll $1 watch at 36″.)

Hearing power of less than one-half normal (see page 57) should indicate specified employment.

(c) Nose:
Septum
Turbinates
Sense of Smell
Obstructions

(d) Speech:
Knowledge of English:
Stutter............Stammer........ Lisp........ Impediment............

(e) Mouth and Throat:
No. of teeth gone..........Condition of remaining teeth..........
Any loose teeth..............Condition of gums............................
Condition of tonsils.............. Thyroid enlargement................

Chest and Abdomen:

Examination should include the findings as determined by inspection, palpation, percussion and auscultation, having special reference to condition of heart and lungs.

Hernia:

Inguinal, complete, incomplete, oblique, direct.
Size of external ring.
Impulse, present or absent.
Femoral hernia.
Ventral hernia.
Umbilical hernia.
Post-operative.
Abdominal wall.

STANDARDIZED METHOD OF PHYSICAL EXAMINATION—*Continued*

ANUS should be examined for hemorrhoids, fissures, fistula protusions.

GENITALS should be examined for conformation, varicocele, hydrocele and scars.

LIMBS should be examined for conformation, deformities, contractures, varicose veins and joint motility.

FEET AND TOES should be examined for flat feet, varicose veins; deformities and joint motility.

HANDS AND FINGERS, right and left, should be examined for deformities, grip and joint motility.

NERVOUS SYSTEM should be examined for knee jerk, foot jerk, Romberg and Babinski signs, fits, tremors, tics.

BLOOD PRESSURE should be taken and blood analysis and urinalysis made at the discretion of the examining physician.

VEINS AND ARTERIES should be examined as to their condition.

SPINE AND JOINTS: appearance and action should be noted.

HEIGHT, WEIGHT AND AGE should be recorded.

For examination of female employees, it is thought best to provide a physician of their own sex, if this should be requested by such employees.

PHYSICAL EXAMINATION RECORD

It is recommended by the Conference Board of Physicians in Industry that the physical findings be entered on a record card such as is presented herewith. This card, 5 x 8 inches in size, is suitable for filing. Details of examination are grouped on one side, leaving space on the back of the card for an anatomical stamp and such descriptions as are found necessary. A check mark can be used to denote normal conditions, and defects found can be described in a word or two, using the back of the card for such details as are needed. Properly filled out, this card will give a clear and comprehensive record with a minimum amount of clerical work. It can be enlarged and extended to cover special cases.

Name.. Male / Female Age........Wt........Ht.......... New / Re-hired Serial No.

20 20

Eyes: Snellens R......... L.........; Near, Wells R.............. L..............: Vis. field R.......... 'L.......... Color R.......... L..........

Ears: Ingersoll R......... L.........; Disease of R.............. L..............; : Disease of Eyes: R.................. L..........

Nose.................................; Throat..; Speech..

Teeth: R 8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8 L Tongue..

8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8 Gums..

Chest.................................; Heart..: Temp. .... Pulse..................

Abdomen.................................. Hernia.. Lungs..

Genitals.................................. Rectum.. Spine..

Nervous Syst.. Vaccination..................

Arm R.................................. L..................................; Leg R.................................. L..................................

Hand R.................................. L..................................; Foot R.................................. L..................................

Fingers R.................................. L..................................; Toes R.................................. L..................................

General Appearance..

....

....

....

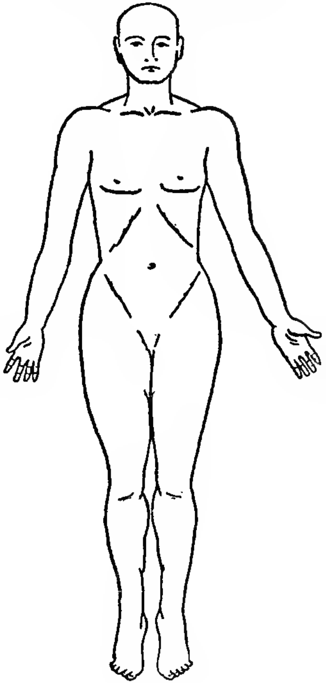
.... CLASSIFICATION..........

(Mark Tooth O when missing; × when decayed; + when capped; = when false)

Date.................................. ....Examining Physician

PHYSICAL EXAMINATION RECORD CARD

ANATOMICAL STAMP



USE CLASSIFICATION:

1.—For persons physically fit for any employment.
2.—For persons physically fit for any employment but below par in physical development or other condition.
3.—For persons physically fit only for certain employment when specifically approved for it by examining physician.
4.—For persons physically unfit for any employment.

PHYSICAL EXAMINATION RECORD CARD (*Reverse*)

PRESENT PRACTICES IN PHYSICAL EXAMINATIONS

The most comprehensive investigation yet attempted of the extent and methods used in making physical examinations of industrial workers was made recently by the Conference Board of Physicians in Industry, the full report being published elsewhere.[1] The essential findings of this investigation are here given.

Reports were obtained from 34 plants representing 15 separate industries and a working force of 410,106, of whom 327,183 were males and 82,923 were females. The 15 industries included were abrasives, automobiles, banking, chemicals, electrical goods, explosives and dyes, light and power, metal trades, petroleum, rubber, shipbuilding, steel, textiles, tobacco and transportation.

In none of the 34 plants were physical examinations of applicants for employment, or of employees, introduced before the year 1900. In only two plants were they in use prior to 1910, and in 23 of the 34 plants they were installed in 1914 or thereafter.

In seven of the 34 plants a woman physician was employed. In one other a woman physician is provided upon request of the women to be examined. In the other plants the examination of both sexes was made by male physicians. It was stated that the principal advantages of employing women physicians for this work were the relief from embarrassment to women applicants, and ability to obtain a more complete examination.

In 18 plants the physical examination was made before employment; in twelve, at the time of employment; and in two, after employment. Two establishments did not answer this question. It has been found that the greatest value of examinations lies in knowing the physical condition of the employee when he enters upon his work, and for this reason in most places applicants are examined when hired and not at some subsequent date.

In 24 of the plants examination is required of all employees; in five, examination is required of men only; and in one plant only a special group is examined. In certain industries special examinations are required for applicants for certain occupations, and in these occupations periodical re-examinations of employees are usually made. Some of the prospective or actual employees subject to special physical examinations are: policemen, firemen, railroad men, cranemen, sand blasters, dye workers, lead workers, food handlers, mine rescue service men, and workers with acids and in especially dusty processes.

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[1] Journal of the American Medical Association, Dec. 18, 1920.

The replies to the questionnaire indicated that, in making the examination in the privacy of the physician's office, in ten plants the men were unclothed to the same extent as when examined for the army; in four plants shoes were not removed; in ten plants men were not examined below the waist; in nine plants the chest was first examined, trousers later being lowered for an inspection for varicose veins; in one plant the men were not unclothed. In two plants women were thoroughly examined by a woman physician; in six plants women were not examined below the waist; in ten plants women were examined with the waist open only for testing the heart and lungs; in the remainder of the plants women were examined for special reasons which required little or no disarrangement of their clothing.

In addition to the routine examinations suggested above, ten plants reported that urinalyses were made. In eight plants blood pressure is taken regularly. In the other plants practice as regards these procedures—urinalyses, blood pressure, Wasserman and tuberculosis—tests are made as indicated.

The time required for making the physical examinations varied from 3 to 40 minutes; in 11 plants the time was 5 minutes or less; in 13 plants the time was 5 to 15 minutes; in 8 plants the time was 15 to 20 minutes; in one plant it was more than 20 minutes, and one plant reported "no definite time." The average time required in 33 plants was 11 minutes per person. If from this average those plants are eliminated in which the examination was very thorough, or for special reasons consumed longer periods of time, the average amount of time required for an examination was 8 minutes. In many of the larger plants a satisfactory examination was given in from 4 to 6 minutes, barring special cases.

RESULTS OF EXAMINATIONS

In 28 of the plants reporting, the results of the physical examinations are used to a greater or less extent as an employment guide. Five plants reported no such use, and one plant did not answer this question.

Physical defects disqualifying for employment varied in the establishments studied from none to many, depending upon the character of the industry and the work to be done. In every case the reason for imposing restriction of employment upon defective workers was based on the fact that, if employed, they might be a danger to themselves, to others, or to property. The physical defects mentioned most often in this connection were: hernia, amputations of arm or leg, loss of vision of one or both eyes, defective vision, cardiac disease, venereal disease, contagious or infectious diseases, kidney disease, tuberculosis, deformity, physical debility, deafness, varicosities, and defective mentality.

Experience has shown that in most plants where physical examinations are in force a number of defective workers are given employment and their work supervised by the medical department. In this investigation the defects permitting limited employment were numerous, but the following were most common: compensated heart lesions, hernia with truss, varicosities, defective vision, deformities, defective hearing, varicocele, first degree flat foot, lung diseases (type not specified).

Twenty-three plants reported that they accept employees with hernia, in some cases to a limited number, and in others only on the execution of a release from responsibility or for special work only. In 14 of the 23 plants no restrictions as regards employees with hernia were noted. Thirty-two of the 34 plants employ workers with flat foot, but in 11 of these such employees are restricted to special work. Fifteen plants accept workers with varicosities, but of this number four limit the employment of such workers, or require them to sign waivers.

In practically all of the 34 plants reporting, it was stated that, wherever possible, defectives were accepted rather than denied employment. When employed, defectives are placed under the supervision of the medical department and are permitted to continue in their occupation as long as they are unaffected by the work in which they are engaged.

It will be remembered that over 30 per cent of all men eligible for military duty were rejected in the draft on account of physical defects. In the present investigation only 4.6 per cent of those reported upon were rejected for the same reason, and if those are excluded who were rejected for special work—such as that of trainmen, cranemen and inspectors, where defective vision or defective hearing was the cause of rejection—but who would have been acceptable for certain other kinds of work, the average proportion of rejections was only 2.8 per cent. Such results show an earnest effort on the part of the examining physicians to place workers in industry rather than to deny them employment, unless when employed they become a danger to themselves, to others or to property. Of those accepted for employment it was shown that 30.3 per cent were sub-standard, while an average of the percentages of employees rated as A-1 in the plants reporting was 57.

The frequency of re-examinations of employees, as reported, varied from one month in certain hazardous occupations, to three years. Seven plants reported re-examinations every six months or oftener; four plants reported re-examinations annually; two plants reported re-examinations every two years; and one plant reported re-examinations every three years. Other plants stated that the time of re-examination was "periodic," "on request," "when indicated," etc. Only two plants reported re-examinations of workers on departmental transfers.

Experience shows that if the examinations are conducted with the proper motives little or no objection on the part of the workers will be met with. While some workers, especially those conscious of some physical defect, may refuse to seek employment in plants requiring physical examinations, there is no means of knowing what the number of such refusals has been. In this investigation the number of workers who were reported as objecting to the physical examination was negligible. The largest number given was 200 among 62,000 employees, where the system of physical examination had been in operation for two years. Ten plants employing 155,010 workers had had no refusals. A plant employing 15,000 reported six objections in three years; another, with 3,300 employees, had had twelve refusals in nine years; still another, with 7,900 employees, reported a few objections.

The reasons advanced against physical examinations in the majority of cases were: "red tape" and "objection to exposure." Other reasons were: "just examined," "too much trouble," "can get employment elsewhere."

The medical directors of a number of plants report an increasing demand on the part of workers for physical examinations, and they anticipate that this demand will increase as the value of this work is recognized.

It is interesting to note the results of the introduction of physical examinations in industry, as reported by the examining physicians. Among those were that physical examinations increase efficiency, result in fewer accidents, lessen absence and labor turnover, eliminate tuberculosis from the plant, reduce the number of venereal disease cases, eliminate other infectious and contagious diseases, make for better adaptation of workers to their jobs, reduce compensation claims, give a clear record of impaired joint function, save useless litigation, increase the number of days at work, and satisfy employees that their interests are being safeguarded.

VII

THE USE OF MEDICAL RECORDS

CLASSIFICATION OF EMPLOYEES

It is well recognized that the requirements for employment vary in different industries, and in different occupations of the same industry. A worker unsuited for one occupation may render satisfactory service when assigned to another kind of work. Three conditions, based upon mental and physical qualifications, are generally considered as forming a basis for rejecting an applicant for employment. If, when employed, he is a danger to himself, to his fellow workers, or to property, it has been found advisable to deny him employment. Providing there are positions open, in many plants other qualifying considerations are waived, and the worker is so placed that his defects will be the least possible handicap to his productive ability.

It was realized by the Conference Board of Physicians in Industry that some classification of employees according to the physical findings was necessary. By correlating the work to be done with the physical findings, three classes of workers were determined upon. To these three classes was added another—those unfit for any employment. The physical limitations of each class are as follows:

Class I. Physically fit for any work.
Class II. Physically under-developed, or with some slight anatomical defect; otherwise fit for any work.
Class III. Fit only for certain employment when specifically approved and supervised by the medical department.
Class IV. Unfit for any employment.

Experience has shown that the large majority of industrial workers falls in Class II. The number of physically perfect individuals in industry or out of industry is relatively small, while the number who do not measure up to perfect standards, though fully capable of rendering efficient service, comprises the large proportion of the industrial population. Such defects as under-development, loss of a terminal joint of a toe, slightly depressed arches, etc., will keep a person out of the physically perfect class, but will in no way detract from ability to fill acceptably any position for which he may be otherwise fitted. Such defects are purely anatomical in character and have little or no industrial bearing.

In Class III are placed workers suffering from defective vision, hernias, marked varicosities, third-degree flat feet, pronounced heart lesions, etc., defects that would debar them from many occupations. It has been found that if the work such employees do is approved and supervised by the medical department so that no undue strain is placed upon their weakness, they may still remain useful and contented members of industry.

It will be well to keep in mind the fact that frequently a person who is aware of his disability—as a worker with a hernia supported by a properly fitting truss, or one with heart disease—will take the necessary precautions to protect himself while at his occupation because he recognizes the lengths to which he may exert himself without danger to his health. For this reason he is deemed a safer risk if left in his accustomed work than if he is transferred to a new job apparently less dangerous, but the demands of which upon his physical strength may not be recognized until some sudden unavoidable strain is placed upon him.

Class IV comprises those persons who, by reason of physical or mental disability are unable to perform any useful labor. Cases of advanced heart disease, advanced tuberculosis, infectious or contagious disease, certain types of insanity, epilepsy and certain other diseases of the nervous system, and most cases of blindness and loss of use of members fall within this class. Such persons usually require constant assistance in performing their own necessary duties, and it is obvious that they cannot, under such conditions, render useful service to industry.

STANDARDIZATION OF MEDICAL TERMS

One of the important questions brought before the Conference Board of Physicians in Industry was that of defining adequately the limits and exact meaning of the medical terminology used in its work. It was recognized that a uniform method of describing physical findings was of importance, particularly in cases where sub-standard conditions were found. Defects, such as hernia, flat feet, varix, etc., which are often present in varying degrees of risk or incapacity, are definitely classified by the terminology adopted by the Board.

This question was given added significance by the fact that a number of plants under one management are often situated in different states, and must of necessity operate under different workmen's compensation laws. In order to co-ordinate and harmonize the status of injuries and defects in the different states when the same came under the compensation laws, a common terminology and well-defined classification of defect had to be established. After a careful study of the laws of the states under which members of the Board of Physicians operated, the following definitions and limitations were unanimously adopted. These have been accepted by many industries as standards for the classification of injuries and of defects occurring among their employees. They are as follows:

EXAMINATION STANDARDS IN REFERENCE TO PHYSICAL DEFECTS NECESSITATING SPECIAL ATTENTION

Special senses: Eye
Ear

Heart: Valvular
Tachycardia (Rapid heart)
Arhythmia (Irregular heart)

Lungs: Tuberculosis (Consumption)
Emphysema (Enlarged air space in lung)
Asthma
Bronchitis

Hernia: Inguinal (Groin)
Umbilical (Navel)
Femoral (Below groin)

Limbs: Contractures
Enlargements
Flat feet
Atrophies (Wasting)
Varicosities

Vessels:	Arteriosclerosis (Hardening of arteries) Varicose veins
Genitals:	Orchitis (Inflammation of testicle) Epididymitis (Inflammation of cord) Varicocele (Varicose veins leading to scrotum)
General:	Rheumatism Nephritis (Bright's Disease) Alcoholism Syphilis Diabetes All eye, ear, skin and other diseases
Spinal:	Tabes (Locomotor Ataxia) Multiple Sclerosis } (Forms of paralysis) Multiple Neuritis } (Forms of paralysis)
Deformities:	Atrophies (Wasting) Hypertrophies (Enlargement) Contractures Curvatures

All Second Degree Defects Should be Considered as Sub-Standard According to Following Schedule:

All Groups Sub-Standard for:	Hernia (2nd degree or more) Varicosities (2nd degree or more) Flat Feet (2nd degree or more) Varicocele (2nd degree or more) Hearing (2nd degree or more) Vision (2nd degree or more)
Also the following:	Arteriosclerosis Endocarditis Tuberculosis Bronchitis } Chronic Emphysema } Chronic Asthma } Chronic

Hernia Degrees:

1st degree: External ring admits tip of little finger; impulse felt.
2nd degree: External ring admits thumb; protrusion.
3rd degree: External ring patulous; bubonocele.
4th degree: Mass reaches external ring level.
5th degree: Mass scrotal.

Varicosity Degrees:

1st degree: Venous mottlings on one or both lower extremities.
2nd degree: Venous cords visible on one or both lower extremities.
3rd degree: Venous cords visible and palpable on one or both lower extremities.

Flat Feet Degrees:

1st degree: One or both arches sagging.
2nd degree: One or both arches touch floor.
3rd degree: One or both arches touch floor with eversion deformity.

Varicocele Degrees:

1st degree: Thickening of cord.
2nd degree: Thickening of cord and dangling testicle and scrotum with laxity.

Vision Defective Degrees:

1st degree equal to $\frac{20}{20}$ in one eye; $\frac{20}{40}$ in other.

2nd degree equal to $\frac{20}{40}$ in one eye; $\frac{20}{70}$ in other.

3rd degree equal to $\frac{20}{70}$ in one eye; $\frac{20}{100}$ in other.

4th degree equal to $\frac{20}{100}$ in one eye; $\frac{20}{200}$ in other.

Hearing Defective Degrees:

1st degree equal voice at 20 feet; Ingersoll $1.00 watch at 36 inches; one or both ears.
2nd degree equal voice at 10 feet; Ingersoll $1.00 watch at 18 inches; one or both ears.
3rd degree equal voice at 5 feet; Ingersoll $1.00 watch at 9 inches; one or both ears.
4th degree equal voice at 2 feet; Ingersoll $1.00 watch at 4½ inches; one or both ears.

Establishment of Physical Standards for Employment

In some industrial plants an effort has been made to establish certain physical and mental standards for the proper placing of workers. These standards are arrived at by means of mechanical and psychological tests which are applied in addition to the physical examination. In these plants the physician, cooperating with the superintendents and foremen, has determined upon the type of person best suited for each job. An attempt is then made to fill those jobs with such workers as can meet the requirements. It is believed by many that such job analysis, which is still in its infancy, holds promise of developing a method of placing workers so that the maximum of efficiency with the minimum of effort will be obtained.

It would seem possible to develop this work by industrial groups. In the main, the job requirements of all textile workers are similar, whether cotton, woolen, or silk mills are under consideration. The same is true of the rubber industry, steel industry, metal trades, transportation industry, etc. These standards for employment in related trades might be developed by the industrial physicians working in these trades who have first-hand knowledge regarding the processes and their requirements. When such standards have become fixed for the various industries, it should result in stabilizing turnover and increasing production, and make for better industrial relations.

THE VALUE OF HEALTH RECORDS IN INDUSTRY

Investigations show that the question of industrial health records is one that has not been given the attention it deserves, with the result that while much work has been done, little of it has been so recorded as to make it available for use in furthering the work in other plants. In order that medical supervision may be accorded its proper place in the industrial world it should be able to produce concrete results so co-ordinated that their value to all lines of industry will be beyond question. Such a position cannot be attained until a relatively uniform method of recording results has been established. When industrial physicians come to think along the same lines and record their findings in such a way that they can be interpreted to advantage by all other workers in the same field, then statistics can be compiled that will have the double value of weight of numbers and uniformity of procedure.

Those who have made studies along these lines have found that much of the data and conclusions now available regarding health conditions in industries are based upon insufficient evidence, and have been gathered from isolated and restricted sources, usually for some predetermined purpose. There is a serious lack of comprehensive accurate data covering industrial illness and absence. Owing to legal requirements, accidents have been more fully recorded. But in this case also, the vast majority of accidents which do not reach the compensable stage are not so recorded as to make the results available for application to industry in general.

In order to evaluate properly the work of the medical department and to know the influence of working conditions and other factors upon the employee, it has been found advisable that records of injury and illness be kept in each plant. Records of absence due to other causes are also of value and are closely allied to the work of the medical department when the absence is investigated and followed up by the visiting nurses or other social workers.

Experience teaches that to be of the greatest service a minimum of data for each of the purposes mentioned should include the following items:

Illness	Injury	Other Causes of Absence
Name and Address	Name and Address	Name and Address
Shop Number	Shop Number	Shop Number
Age	Age	Age
Sex	Sex	Sex
Race	Race	Race
Department	Department	Marital Condition
Occupation	Occupation	Department
Diagnosis	Cause	Foreman
Amount of time lost	Part of body injured	Occupation
Amount of equivalent wages lost	Nature and extent of injury	Reason
Cost of doctor, drug and hospital expense	Amount of time lost	Amount of time lost
End result	Amount of equivalent wages lost	Amount of wages lost
	Cost of doctor, drug and hospital expense	End result
	End result	

Practical experience has shown that if the information available from the use of the above record system is collected and analyzed it will point to weak spots in the establishment, whether they be due to unhealthful conditions, to unsafe practices, or to unsatisfactory supervision. The two items of wages lost and medical and hospital expense are important as showing (a) the direct economic loss to the worker and the indirect loss to the company due to lowered production, and (b) the direct cost to the company and individual, and the indirect cost to the community of this particular injury or illness.

The information called for under illness tells what the trouble is, and its economic consequences, leaving to the industry concerned the determination of the cause and the solution of the problem of preventing similar conditions. The cause will concern the individual plant, primarily, while the diagnosis and economic consequences are pertinent to industry in general and to the community.

Injury records likewise will afford data of economic and medical value applicable to industry in general, as well as information of vital importance to the particular establishment where the records originate.

Questions of plant administration, economic loss to the establishment, to the individual, and indirectly to the community, are emphasized in the absence records. Such a record may indicate too much laxity of discipline and want of proper supervision by a superintendent or foreman.

When sufficient information of this kind is available for industries and communities it should be possible to determine with a fair degree of accuracy the influence of a worker's industrial environment upon his health and efficiency. And largely upon his health depends his efficiency.

The collection of such accurate data will be of benefit to other plants seeking to install medical supervision departments. It will help to show them their problem and point the way toward a solution.

The added cost of keeping a set of simple records as outlined has been found to be insignificant. Much of the information called for is available in existing plant records, in a different form, possibly, and it can be adapted to the purpose designed with no great difficulty.

It is believed that when such records are gathered from industry as a whole and analyzed, the analysis will give a picture of great value to industry, to the state, and to the nation.

APPENDIX

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